

REMARKS

The specification and claims have been carefully reviewed in light of the examiner's action. The specification has been amended on page 11 to correct a minor error.

Claims 1 and 3 have been cancelled, and rewritten as new claim 22, for clarity and to further distinguish over the prior art. Claims 4, 5, 6, 7, 8, 9, 13, 14, 15, 16, 20, and 21 have been amended to indicate their dependence on new claim 22. Claim 10 has been amended to indicate its dependence on new claim 22, and for clarity. Claim 12 has been amended to indicate its dependence on new claim 22, and for clarity. Claim 17 has been amended to indicate its dependence on new claim 22, and for clarity. Claim 11 has been cancelled, as its subject matter is included in new claim 22. Claim 18 has been cancelled and rewritten as new claim 23 to depend on new claim 22, and to more clearly define the separator. Claim 19 has been cancelled and rewritten as new claim 24 to depend on new claim 22, and to more clearly define the separator. No new matter has been added.

Before taking up the claims in detail attention will be briefly given to the references cited by the Examiner. The Examiner rejected claims 1-20 under 35USC Sect. 112, as having insufficient basis for the claim limitation "said first electrode active material". New claim 22, the only independent claim and on which the other claims depend, now recites first and second electrodes, which it is believed traverses the Examiners' objection. The Examiner rejected claim 19 under 35USC Sect. 112, as being

indefinite because the mixture will never be less than 105%. New claim 24 which is claim 19 rewritten, it is believed corrects this error.

The Examiner rejected claims 1-4, 9-17, and 21 as obvious, 35 USC Section 103(a), over the US Patent to AIHARA et al No. 6,387,565 B1, in view of the US Patent to ARRANCE et al. No. 3,625,771 A, and in further view of the US Patent to BENCZUR-URMOSSY et al. No. 4,039729 A.. The AIHARA et al patent is directed to a battery which does not have an outer case, with electrodes joined by a separator and an adhesive resin layer. In other words the AIHARA et al patent uses a microporous separator glued to both electrodes, with two layers of glue, one on each side of the separator, which adhesive is porous with a ceramic filler. AIHARA et al does not teach a porous ceramic separator, or the use of expanded metal microgrids as current collectors. . The US Patent to ARRANCE et al. is directed to production of a flexible battery separator by dip-coating an electrode, such as a silver or zinc electrode in a mixture of a major portion of an inorganic or ceramic separator material , and a minor portion of potassium titanate, and a minor portion of a mixture of organic substances including an organic polymer, with electrode placed in the mixture and removed, with the coating air dried. ARRANCE et al is not for a Lithium battery, and uses quite different chemistry. The separator alone contains ceramic material with no ion-conducting adhesive such as called for by applicants. The BENCZUR-URMOSSY et

al. Patent is directed to a rechargeable galvanic cell with a zinc electrode and auxiliary structure. This battery is not a Lithium battery, and has entirely different chemistry. The BENCZUR-URMOSSY patent does not have the ion-conductive adhesive layer of applicants, nor does it have the ceramic separator of applicants. There is nothing in any of these patents that suggests that they could be combined, and the chemistry is different.

Applicants' claim 22 calls for a lithium based electrochemical device which has at least a first and second porous electrodes, which include expanded metal microgrids with active materials and a binder thereon, with at least one porous ceramic separator containing particles of an electrically insulating material, and a binder. The separator is in bonding contact with the first electrode active material, with an organic ion-conductive adhesive layer on the other side in adherent contact with the separator, and the second electrode. A non-aqueous electrolyte is provided in contact with the electrodes, and the separator, with an enclosure surrounding and containing the device. Applicant's device is very different from those described in these patents in that Applicants' have a porous ceramic separator, with one side in bonding contact with the active material on the first electrode, and with the second electrode glued to the ceramic separator by a layer of ionically conductive non-porous polymeric adhesive. The polymeric adhesive does not have any ceramic filler, and it is loaded with electrolyte and salt. AIHARA et al for example has a microporous

polymeric separator which is glued to both electrodes by a glue layer on each side of the separator, and which adhesive is a porous adhesive with a ceramic filler. The remaining claims dependent on claim 22 with all its limitations also call for structure not found in the cited patents.

The Examiner also rejected claims 5-7 under 35USC 103(a) as unpatentable over the Patents to AIHARA et al., ARRANCE et al., and BENCZUR-URMOSSY et al., as described above, and further in view of the US Patent to YUN et al. No. 7,279,251 B1. The YUN et al patent is directed to a lithium secondary battery comprising a super fine fibrous polymer separator film and its fabrication method. The chemistry is different from that of applicants', and YUN does not disclose applicants' porous ceramic separator with a layer of organic ion-conductive adhesive , nor does it disclose the other structure of applicants'.

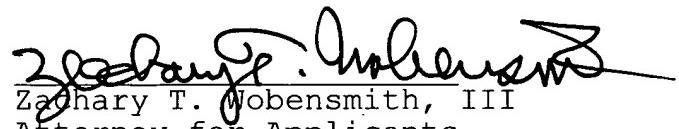
The Examiner rejected claim 8 as obvious 35USC Sect. 103(a) as unpatentable over the patents to AIHARA et al., ARRANCE et al., and BENCZUR-URMOSSY et al., as described above, and further in view of the US Patent to MITCHELL et al.. The Examiner admits that AIHARA et al., ARRANCE et al., fail to teach a PVDF/HFP copolymer adhesive, but relies on MITCHELL as disclosing it as an adhesive. The MITCHELL et al. Patent describes a polymeric binder to be part of the electrode and be an adhesion promoter. MITCHELL does not describe the electrochemical device of applicants' with a ceramic separator and an organic ion-conductive adhesive layer on

the separator for bonding it to the second electrode.

As described above it is believed that the claims have been distinguished from the prior art patents cited by the Examiner and are allowable.

Accordingly it is believed that the application is in condition for allowance and such action is requested and urged.

Respectfully submitted,

  
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